A. E. CROWHURST.

HOT WATER HEATING SYSTEM.

APPLICATION FILED APR. 7, 1908.

913,364. Patented Feb. 23, 1909.

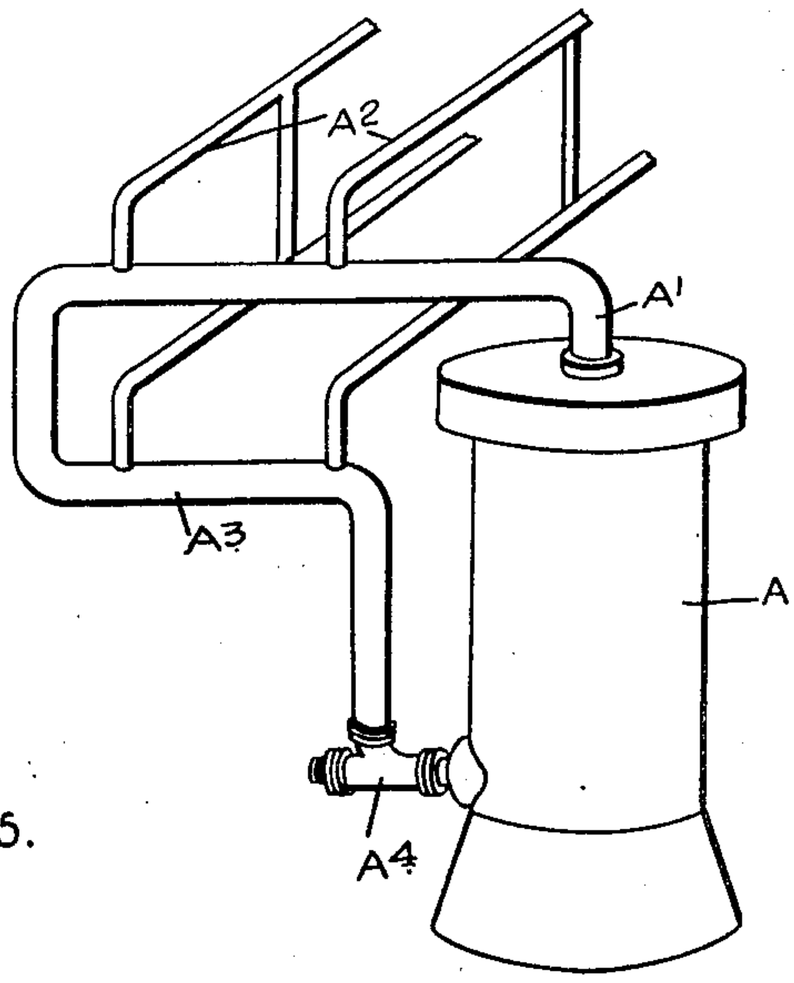

FIG. 1.

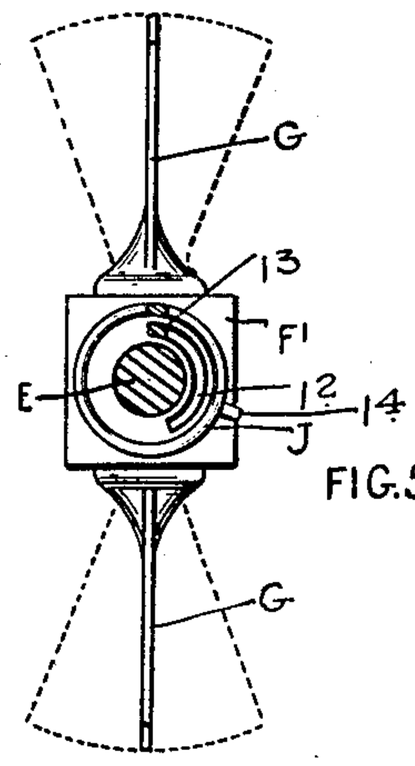

FIG. 5.

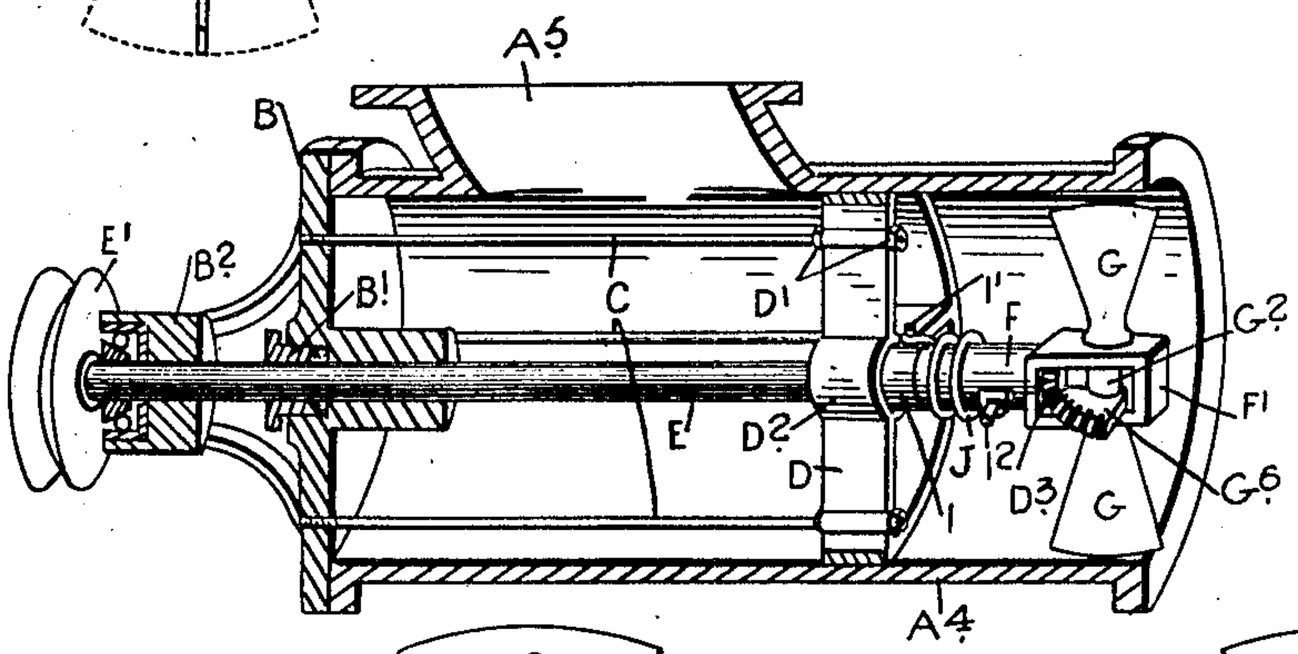

FIG. 2.

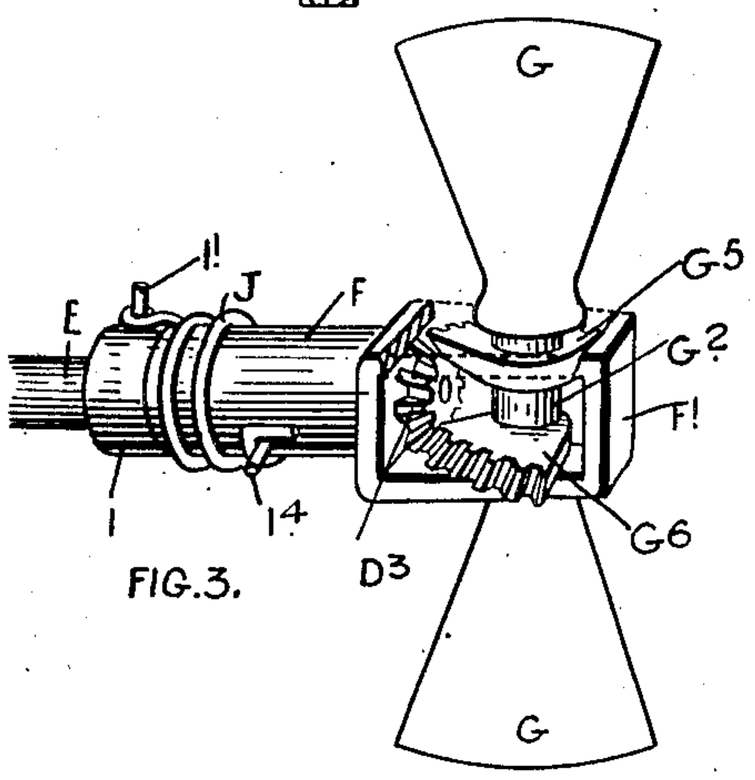

FIG. 3.

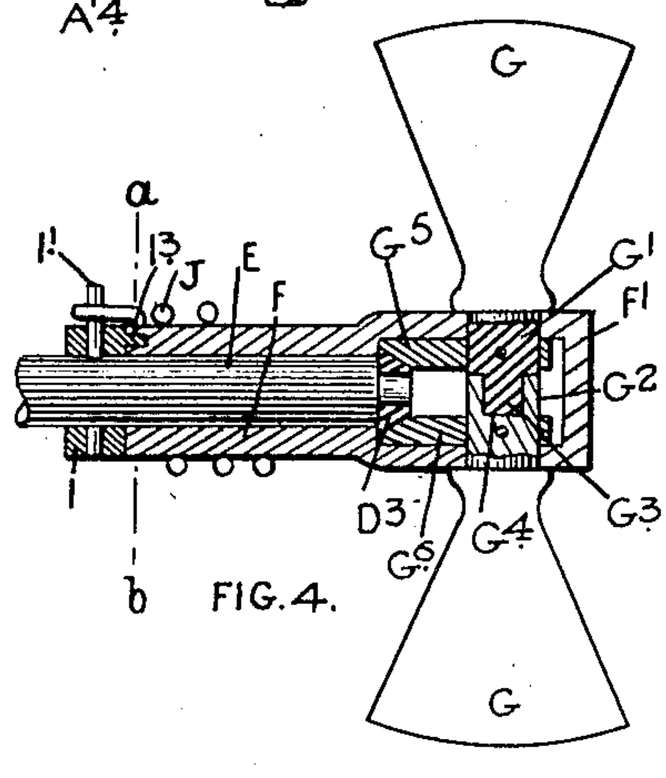

FIG. 4.

WITNESSES.

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HOT-WATER HEATING SYSTEM.

No. 913,364. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed April 7, 1908. Serial No. 425,695.

To all whom it may concern:

Be it known that I, ALBERT ERNEST CROWHURST, of the village of Humber Bay, in the county of York, in the Province of Ontario, Canada, florist, have invented certain new and useful Improvements in Hot-Water Heating Systems, of which the following is the specification.

My invention relates to improvements in hot water heating systems, and the object of the invention is to devise a means whereby the circulation of the water in a gravity system of heating may be accelerated in order that all the pipes, both flow and return, may be kept at the same temperature and thus produce an even heat throughout the building and at the same time reduce the consumption of fuel to a minimum.

A further object is to make the device, so that it will automatically change its position if not in use to suit the ordinary conditions of a gravity system and without effecting the effectual operation of the same.

A still further object is to produce in a heating system a device in which there will be no valves or by passes used.

Yet further objects are to make the device capable of being used in a system independent of gravity and capable of repair by any unskilled person.

My invention consists chiefly of a casing interposed between the end of the return pipe and its entrance to the heater, a spindle journaled in suitable bearings, means for driving the spindle, and blades mounted thereon and provided with means whereby when the shaft is stationary they lie on a plane parallel to the axis of the shaft and the course of the circulation, but when the shaft is rotated they assume a position at an angle to a plane at right angles to the plane of the axis, so as to induce a circulation, the parts and the circulation pipes being otherwise arranged as hereinafter more particularly explained.

Figure 1, is a perspective view of a heater showing the arrangement of the pipes and the location of my improved device for accelerating the circulation of the water therethrough. Fig. 2, is a sectional perspective view of the casing. Fig. 3, is a detail of the blades and their connection to the spindle. Fig. 4, is a longitudinal section through the spindle and parts coöperating with the blades. Fig. 5, is a cross section on line *a*—*b* Fig. 4.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the heater and A′ are the flow pipes having two branches A^2 extending from the same and passing back into the return pipe A^3.

A^5 is a casing having a right angular branch A^5 by which it is connected to the end of the return pipe. The inner end of the casing A^4 is flanged and suitably connected to a flanged pipe near the bottom of the boiler. The outer end of the casing, which is cylindrical is provided with a head B having a stuffing box or gland B′, which is held in position by the rods C extending therethrough and through the spider D and provided with nuts D′ at their inner ends. The head B has formed or attached to it the bearing B^2, which may be a ball or any other suitable bearing and extending through the bearing B^2, stuffing box B′ and the head D^2 of the spider D is the spindle E, which is provided with the driving pulley E′ from which it is driven from any suitable source of power, at one end and a bevel gear D^3 secured to the reduced opposite end.

F is a sleeve loosely mounted on the spindle E and provided with an end casing F′ in which is located the gear D^3 and in which are journaled the stems G′ and G^2 of the blades G. The stem G′ is provided with a reduced portion G^3 at the lower end thereof and the stem G^2 with a recess G^4 into which the reduced portion G^3 fits, thereby journaling one stem within the other. The stems G′ and G^2 are provided with segmental bevel gears G^5 and G^6 designed to mesh with the gear D^3 of the spindle E. The gears G^5 and G^6 are suitably secured to the stems G′ and G^2.

I is a collar secured on the spindle E at the opposite end of the sleeve F having a pin I′ securing it to the spindle.

J is a spiral spring encircling the sleeve and having one end confined by the projecting end of the pin I′ and the opposite end confined by a pin I^4 held in the sleeve F.

I^2 is an arc-shaped recess concentric to the center of the shaft E and formed in the inner end of the sleeve F. I^3 is a projection extending from the collar I into the recess I^2.

The normal tendency of the spring J is to force the sleeve around, so as to bring the projection I^3 against the ends of the recess I^2 (see Fig. 5) and thus throw the blades par-

allelly to a plane passing through the axis of the shaft and thereby offer the least obstruction possible to the circulation of the water when my device is not in use. When my device is in use, however, and the spindle E is rotated the circulation of the water is accelerated for the reason that the gear D^3 intermeshing with the quadrantal gears G^5 and G^6 rotates the spindles and the blades into an angular position substantially crosswise of the shaft, thereby acting to impel the water rapidly into the body of the heater and through the same and thus producing a forced circulation. When the projection I^3 contacts with the other end of the recess I^2 the sleeve is necessarily forced around, the spiral spring I being brought by this movement into tension and this tension immediately the spindle E stops rotating carries the sleeve around, so as to cause the gears D^3 and G^5 and G^6 to reset the blades in the normal position shown in the drawing. It will thus be seen that if I do not wish a forced circulation all it is necessary to do is to stop the rotation of the spindle E when the gravity circulation is restored to the system. It will also be seen that should the power give out by which the spindle is rotated or should anything happen to the power drive of the spindle the stoppage of the spindle will immediately set the blades to the normal position.

What I claim as my invention is:

1. A hot water heating system comprising supply and return pipes, a casing interposed intermediate the length of the same, a spindle extending through the center of the casing, blades carried by said spindle, automatic means for holding the blades parallel to a plane passing through the axis of the spindle when the spindle is at rest and for carrying the blades to an angle set in relation to the spindle when the spindle is rotated.

2. In a hot water heating system, the combination with supply and return pipes and the heater, of a cylindrical casing having one end thereof extending into the return pipe leading to the heater and having an outlet extending at right angles thereto and connected to a continuation of the return pipe and having a head at the opposite end of the casing carrying a journal and stuffing box, a spindle journaled in the aforesaid journal and in a suitable bearing on the inside of the casing, blades connected to the shaft and adapted to lie parallel to the plane of axis of rotation when the shaft is stationary and means operated through the rotation of the shaft for forcing the blades to the desired angle to induce circulation as and for the purpose specified.

3. In a hot water heating system of the class described, the combination with the casing and spindle having one end connected to the return pipe next the boiler and an outlet connected to the continuation of the return pipe, of a spindle suitably journaled in the casing and suitably driven, a sleeve loosely mounted on the spindle and provided with an end casing, blades having the spindles thereof journaled in the casing, gears secured to the spindles of the blades, a gear secured to the main spindle and meshing with the aforesaid gears for normally holding the sleeve and blades in inoperative position, as and for the purpose specified.

4. In a hot water heating system of the class described, the combination with the casing and spindle having one end connected to the return pipe next the boiler and an outlet connected to the continuation of the return pipe, of a spindle suitably journaled in the casing and suitably driven, a sleeve loosely mounted on the spindle and provided with an end casing and a concentric recess at the opposite end, blades having the spindles thereof journaled in the casing gears secured to the spindles of the blades, a gear secured to the main spindle and meshing with the aforesaid gears, a collar secured to the spindle at the opposite end of the sleeve and provided with a projection extending into the concentric recess aforesaid, and a spiral spring encircling the sleeve and connected at one end to the collar and at the opposite end to the sleeve as and for the purpose specified.

5. In a hot water heating system, a rotatable spindle and suitable bearing therefor designed to be inserted in the shaft or pipe, blades affixed in the ends thereof, and adapted to lie parallel on a plane through the axis of rotation, when the spindle is at rest and means for automatically carrying the blades to an angle set in relation to the shaft when the shaft is rotated.

ALBERT ERNEST CROWHURST.

Witnesses:
B. Boyd,
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